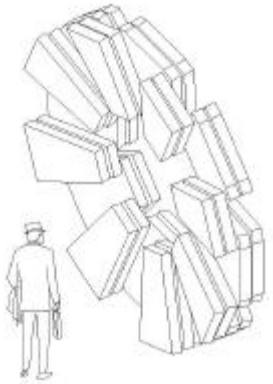
ATLAS – Cathode Strip Chamber Electronics



61,440 channels of on-chamber readout electronics

49,152 – Precision co-ordinate channels

12,288 – Transverse co-ordinate channels

Front-End electronics consists of two modules namely ASM I and ASM II (ASM : Amplifier Storage Module)

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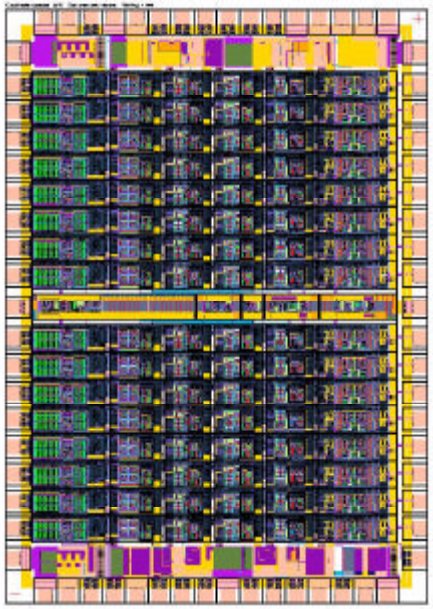
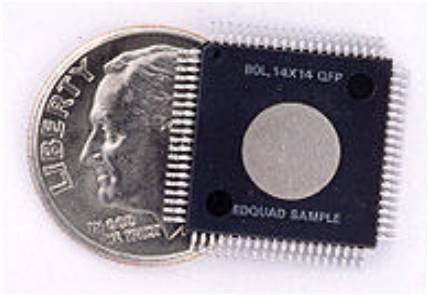
Amplifier Shaper Module I (ASM I)

ASM I board consists of 8 - 16 channel Charge-Sensitive Preamp/Shaper



Technology	**:**	**0.5 um CMOS**
Channels	**:**	**16**
Die size	**:**	**2.78 mm x 3.96 mm**
Intended Cdet	**:**	**20 to 100 pF**
Noise	**:**	**1150 + 17.6 e-/pF**
Gain	**:**	**3.8 mV/fC**
Max. Linear Q	**:**	**450 fC**
Output Stage	**:**	**Class AB, swings to Power supply - 250mV**
Pulse Peaking Time(5% to 100%)	**:**	**73 ns**
Power Supply	**:**	**+3.3V**
Power Dissipation	**:**	**32.5mW/Channel**



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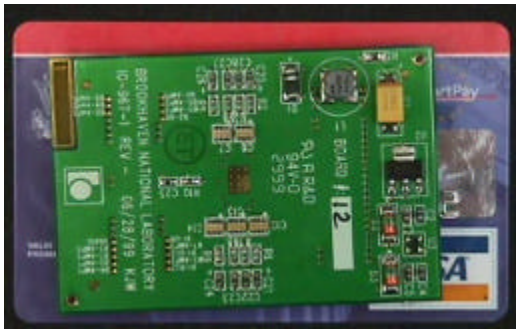
CSC Preamplifier/Shaper Milestones

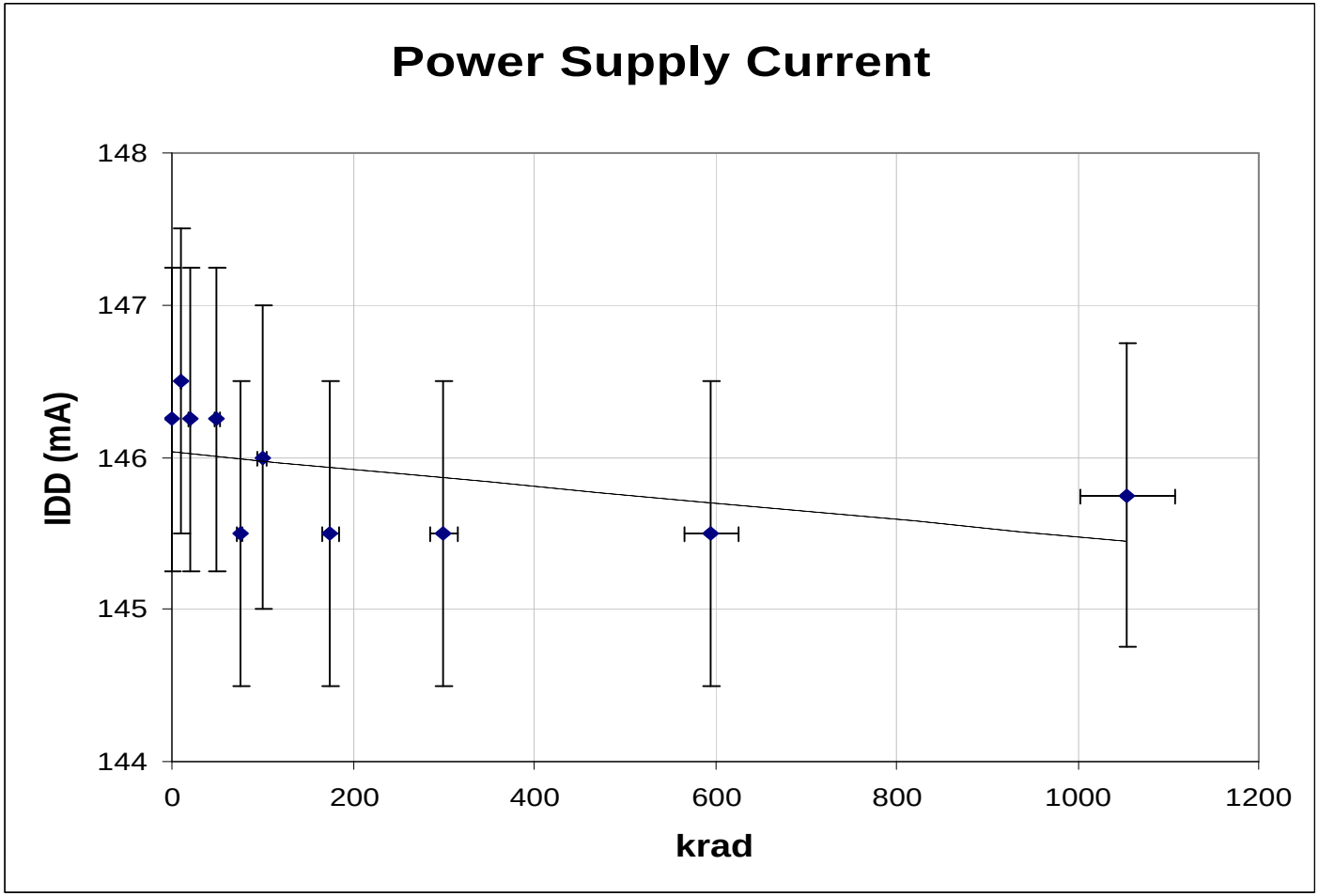
- First prototype completed – August 1999
- Monolithic P/S were used at 1999 CERN beam test



- Monolithic P/S subjected to Ionizing doses – Jan 2000 (up to 1055 Krad, ^{60}Co. Worst case dose for CSC is 44 Krad over 10 years.

The device parameters measured were unchanged after 50 krad. A 2.5% decrease in gain, and a 17% increase in noise were seen after 1 Mrad. DC voltage at the inputs and outputs shifted negative, but the waveform was essentially unchanged.

CSC Preamplifier/Shaper Ionizing Radiation results



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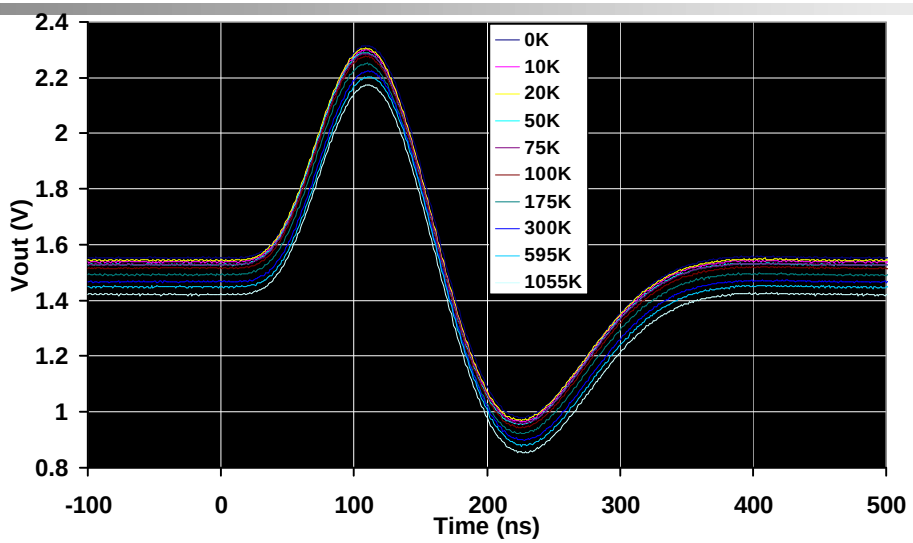
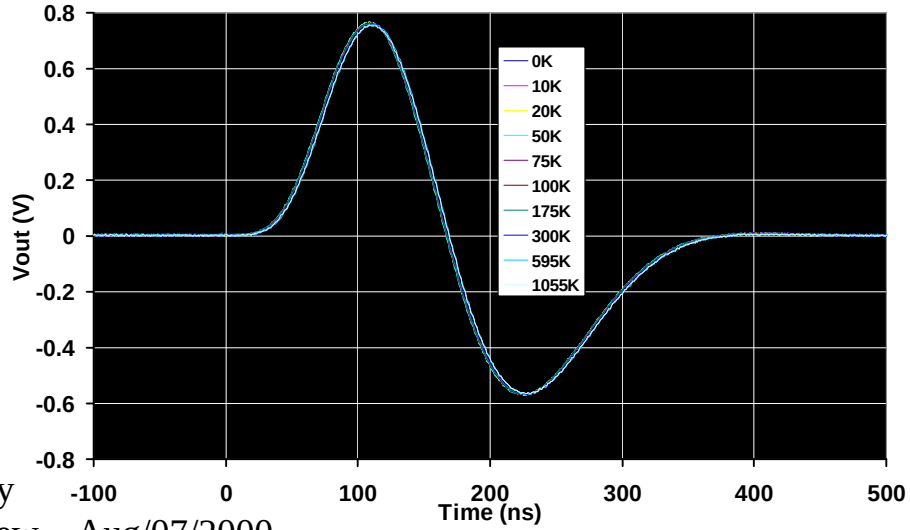
CSC Preamplifier/Shaper Ionizing Radiation results





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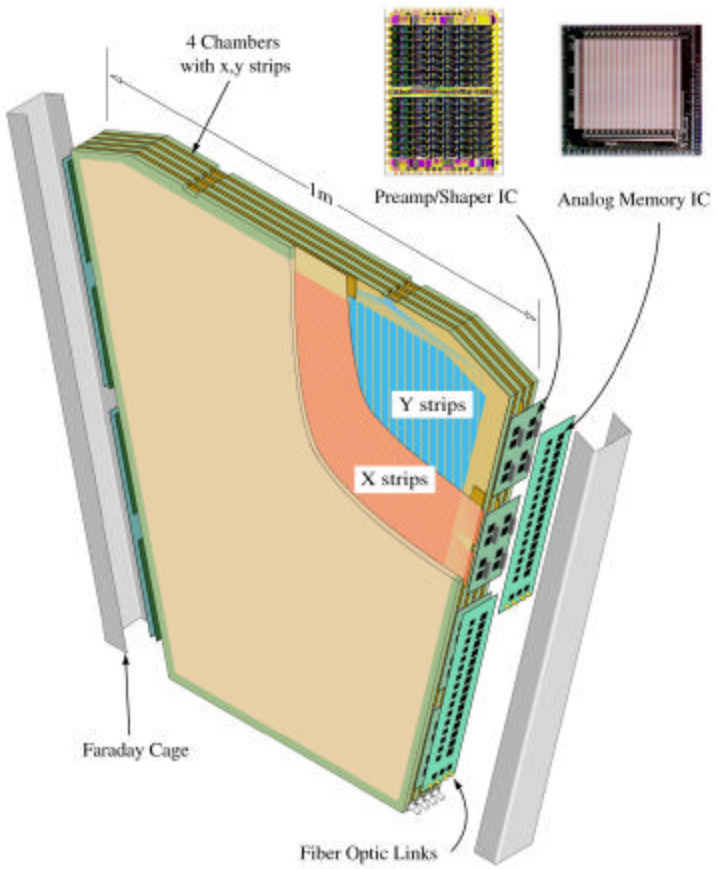
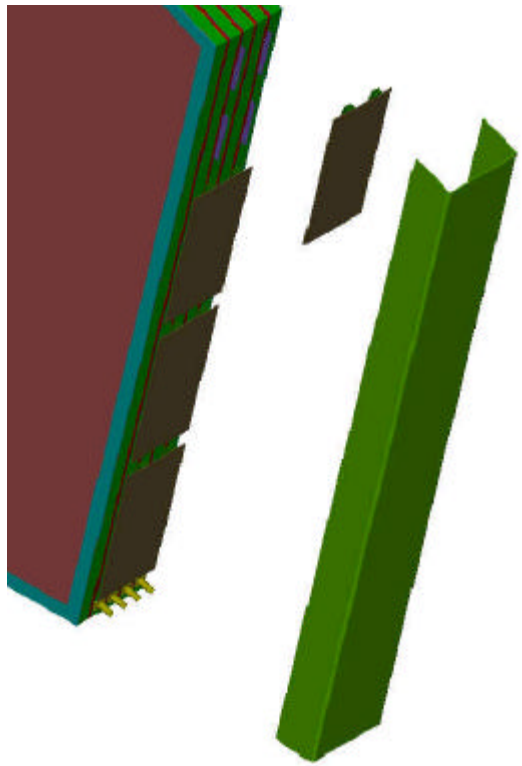
ASM I Board Details





ASM I Facts and Figures

- 96 Channels per board
- 10 Boards/Chamber

  4 X strip - Left boards (Plane 1 and 3)
  4 X strip - Right boards (Plane 2 and 4)
  2 Y strip boards

- 256 Lx , 256 Rx and 128 Y boards for the system
- $386 per. 96 channel Board

ASM I Facts and Figures

- Interface to readout strips using card edge connectors
- Analog signals from the ASM I board passes through a transition board to the ASM II board.
- The transition board spans two ASM I boards and one ASM II board.
- Total power consumption of ASM I : 4.2 Watts

ASM I and Sister Boards

- 3 types of ASM I
  - Right X
  - Left X
  - Y strip, needs a flex-rigid type of construction to meet space constraints (two types)

- 2 types of transition boards

- Grounding Boards (2 per chamber)

- Calibration Board (1 per chamber)

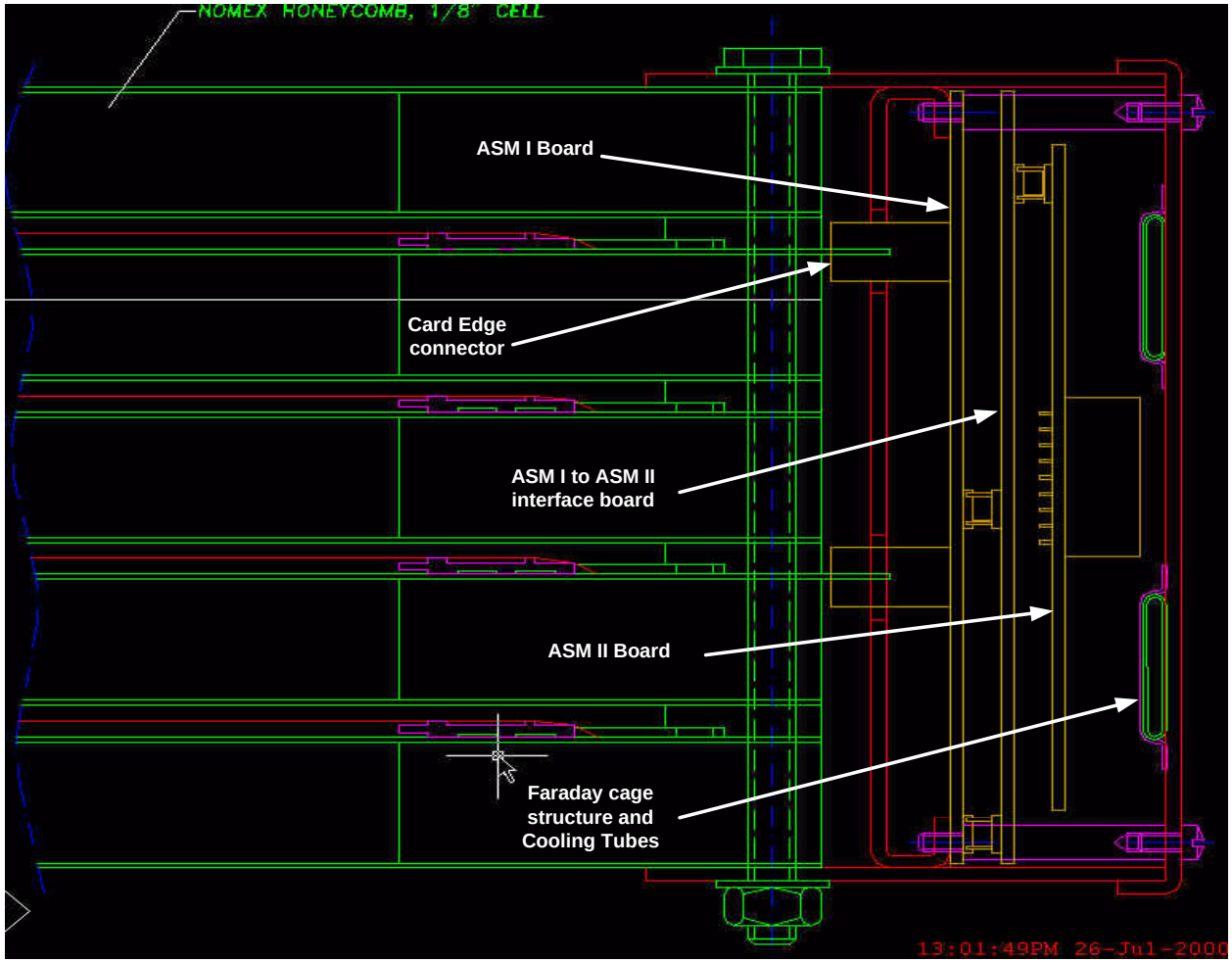
Power, Grounding and Cooling

- Local Low drop out regulators will provide the required 3.3V to the ASM I board.

  CERN/ST Rad Hard LDO regulators.

- Faraday cage and cooling fixture encloses the ASM boards and the mounting hardware provides the system GROUND for the electronics

Faraday cage and Cooling fixture



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